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## INNOVATIVE TECHNIQUE TO ANALYZE HUMAN-DOG/ PET BEHAVIOUR

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**Abstract :** The study deals with the various techniques to analyze the human and pet dog behavior. We all know how the dogs have become an integral part of our lives in today's world. Every second house has a dog acting as a companion considering the existence of nuclear families. As human is critical to understand, same is the pet dog nature which needs to be analyzed completely. Pet dogs replicate their owners it is very critical to behave appropriately with them just like we do with human babies. Intonation and expression plays a very important role as pet dogs process them in a similar way to humans. Dogs engage in social referencing by responding in a way that correspond with their owners reactions in quite a few context. This study will help, even a first time owner, to understand and bond with their pet dog without any limitations and good comprehension of the behavior and response. Basically to know the compatibility of both numbers of techniques were used and some were proved to be effective and some not. The relation between both is unique in itself. As dogs cannot speak but they can express their each and every feeling if we tend to understand. This study is focused on the behavior of pet dogs and their relations with their owners. After going through many studies it is well understood that there are lot of factors which identifies the behavior of a pet dog. Dogs being the famous social animal they are tested to check the conformity. Applied Behavior Analysis is one of the techniques which were earlier applied to analyze the behavioral changes in humans but it is later applied on canine too. The effect of dogs on college going students plays an important role in keeping their mood good and relaxed. People owing dog at house are positively influenced as compare to the one who don't own a dog. The bond between the dog and owner really impacts the dog's nature and the serum oxytocin level in dogs. The positive and healthy relationship between the owner and the dog positively affects the level of oxytocin in dogs. The relationship between the dog related factors and owners attitude towards pets impacts much. The experienced and unexperienced dog owners are in existence, having a dog earlier does not ensure the 100 percent efficiency to understand the new dog completely. Whenever owner pets his or her pet then blood pressure and heart rate of pet dog drops. So the affectionate behavior towards the dog results in good health of a dog. The family owning a pet dog with them has children with more physical activities involved, physically much active and increased social and emotional development. Dogs also show spontaneous helping behavior towards humans probably in domestic ones. Studies have shown that dogs living in shelter are more attached to humans as compare to the dogs living in foster places. Intra specific motor and emotional alignment in dogs is the one factor which acts as the understanding factor between the pet dog and human. Rapid mimicry and Yawn contagion are two behavioral processes intermingled in the animal synchronization domain. The behavior of dog is also measured by the leash tension meter that measures pull directions force during human-dog leash walks. So the best out of all the studies it has been found that longitudinal studies increase knowledge about the underlying social cognitive processes that drive human behavior and shape the relationships with animals.

**Index Terms** – Various techniques, general method, proposed work, layout of approach

### I. INTRODUCTION

There exists number of diseases in humans as well as in dogs. Few are very common and others are rare. Neuropathic pain in dogs is also of one kind. It is an abnormal painful response which is caused by injury to nerves, part of brain, spinal cord. Number of types of neuropathic pain exists, i.e., hyperalgesia, allodynia. To diagnose this disease we need to check some other painful conditions in dogs such as osteoarthritis and bone cancer. Diagnosis includes radiographs, CT or MRI imaging. Conformity is a term which is commonly known to be theory of cultural evolution and social learning research. Also it could be defined as capability to adopt the majority of choice where no individual choice is preferred. Dogs being the famous social animal they are tested to check the conformity. Applied Behavior Analysis is one of the techniques which were earlier applied to analyze the behavioral changes in humans but it is later applied on canine too. Dogs are being analyzed by applied behavior analysis to verify their changing nature. The effect of dogs on

college going students plays an important role in keeping their mood good and relaxed. Studies are being done to verify that people owning dog at house are positively influenced as compare to the one who don't own a dog. The relationship of dog and owner is affected by number of ways. The people having one dog results in more care for the dog as compared to the person having more than one dog. The children present in house negatively affect the relationship of dog and his or her owner. Sometimes the behavior of dog itself affects the relationship, if the dog is aggressive or introvert. So there are many factors which affect the relationship of dog and its owner. So the characteristics of both dog and owner affect their relationship. Also the bond between the dog and owner really impacts the dog's nature and the serum oxytocin level in dogs. The positive and healthy relationship between the owner and the dog positively affects the level of oxytocin in dogs. The expectations and reality about the dog-owner relationship are totally different. The experienced and un-experienced dog owners are in existence, having a dog earlier does not ensure the 100 percent efficiency to understand the new dog completely. The nature and the behavior towards the dog and the nature of dog vary on a very vast note. The perceptions of dog ownership are to be measured for better relationship with a pet dog. Some social cognitive measures and some problematic behaviors of dogs are to be analyzed for the perceptions to be achieved. The relationship between the dog related factors and owners attitude towards pets impacts much. Surplus studies have been published already with vast types of results. Whenever owner pets his or her pet then blood pressure and heart rate of pet dog drops. So the affectionate behavior towards the dog results in good health of a dog. Dog play, family dog walking and pre-schooler social-emotional development plays an important role in families of humans. It has been found that the family owning a pet dog with them has children with more physical activities involved, physically much active and increased social and emotional development. Also this helps children to learn responsibility and loving, caring nature, sense of identity and independence from dogs. Animal assisted therapies are also considered very helpful. These are considered co-intervention therapies in support of conventional therapies. The human and animal bond is considered to be the factor which positively affects the human psychophysical well-being. The people who are currently working at the places which are more exposed to high risks are much active towards traumatization for example police officers, firefighters etc. So owning a pet relaxes their mental health and mind. There are then less chances of getting traumatized as compare to others who don't own a pet at their homes. Dogs also show spontaneous helping behavior towards humans probably in domestic ones. Studies showed that chimpanzees are very helpful and then dogs are also proved to be helpful towards humans. Though in many cases lot of training is required to train them for acquiring a helping nature in them. Police uses them, they help the blind to assist but that requires training. Apart from training dogs are proved to be helpful beings. The bond between human and dog makes this sense of helpfulness more strong than before. Human-Dog attachment in foster and shelter environment also makes some difference in the bond of a human and a dog. Dogs living in shelter are more attached to humans as compare to the dogs living in foster places. As there is more interaction between human and dogs at homes as compared to the fosters. And dogs are really attachable when more time is spent with them. Intraspecific motor and emotional alignment in dogs is the one factor which acts as the understanding factor between the pet dog and human. They intend to know the behavior of human when they used to be sad, crying, humming and many more behaviors. All these come in existence when some is being spent with each other. Rapid mimicry and Yawn contagion are two behavioral processes intermingled in the animal synchronization domain. The behavior of dog is also measured by the leash tension meter that measures pull directions force during human-dog leash walks. It is to be considered well that how much the leash should be tightened and how loose it should be. Intraocular and neck pressure were measured on the well trained dogs on command by digital force gauge. Leash tension is rarely constant on regular walks as dogs pull it in different directions. So the leash tension for the dogs must be adjusted as per their age and breed.

## II. LITERATURE REVIEW:

In total 25 research studies have been analyzed for defining the problem.

**Table1. Various techniques to analyze Human-Dog behavior and their outcomes:**

S. No.	Work	Objectives	Methodology	Outcomes
1	Sarah A. Moore, 2016	Study focused on somatosensory disturbance & neuropathic pain in dogs.	Neuropathic pain, spinal cord injury, hyperesthesia, allodynia, dog.	Veterinary clinicians should be aware of neuropathic pain as a potential entity and should consider it when developing a multimodal approach to pain management.
2	Markus Germar, Amira Sultan, Julian Kaminski, Andreas Mojzisch, 2018	To examine whether dogs show conformity.	Statistical Analysis and Bayesian Analysis	Systematically investigate the conformity factor helps to detect the conformity in dogs.
3	Nicole Pfaller-Sadovsky, Gareth Arnott, Camilo Hurtado-Parrado, 2019	To investigate the feasibility & effectiveness of procedures used in human related to applied behavior analysis of clinical animal behavior.	Functional analysis, Behavioral skills Training.	The access to a tangible item was the maintaining Reinforcer and reinforcers maintaining the behaviour of jumping up.
4	Mariah J. Picard, 2015	To determine whether first-year college students' interaction with a dog would have a positive effect on their mood and anxiety.	Participants, demographic survey, pet attitude scale, PANAS-X, STAI, PSRS	Direct interaction with dogs can be effective in increasing students' positive moods.
5	IbenMeyer,Bjorn Forkman, 2014	Use of dog-owner relationship as measured by Monash Dog Owner Relationship Scale (MDORS).	Companion Dog-owner relationship MDORS	The behavior of the dog is less important for the owner's perception of the relation
6	Luminta, Diana Hritcu, CristinaHorhoge, AlinCiobica, MihaelaClaudiaSpatar u, ConstatinSpataru, Annakis, 2019	To replicate previous findings of canine serum oxytocin increase a positive dog-human interaction.	Oxytocin, neurohormone, Social behaviour, dog.	Male and female humans are known to interact differently with dogs, and dogs, in turn, differentiate between the two sexes.
7	Esther M.C.Bouma, LonnekeM.Vink and Arie Dijkstra, 2020	To explore how self-efficacy, social comparison, perceptions about the (dis)advantages of ownership.	Dog ownership history; relationship; longitudinal satisfaction.	Longitudinal studies increase knowledge about the underlying social cognitive processes that drive human behavior and shape the relationships with animals.
8	Woo-Hyun Kim,	To investigate the	Dog ownership, exploratory	This study highlights the

	Kyung-Duk Min, Sung-il Cho, Seongbeom Cho, 2020	characteristics of Korean dog owners and their pet dogs and identifies the owner- and dog- dependent factors that influence the owners' attitudes toward pets.	study, human-animal bonds, Korean pet culture, Pet Attitudes Scale	importance of a pet dog's health, size, and origin. Considering these factors could foster a more desirable relationship between humans and animals.
9	Elizabeth J. Wenden, Leanne Lester, Stephen R. Zubrick, Michelle Ng and Hayley E. Christian, 2020	To investigated if active play& walking with the family dog was associated with better social- emotional development in young children.	Strength and Difficulties Questionnaire (SDQ)	The possible physical activity and social-emotional developmental benefits of family dog ownership for pre-schoolers, and that these benefits may present in early childhood.
10	Mia Esterhuyzen, 2020	To establish the suitability of using the C-DAS and OPRS-M in the South African context.	C-DAS; OPRS-M; PAS-M; LAPS  Pet Attitude Scale Owner-Pet Relationship Scale.	Translating the measurement instrument in to 11 languages can be performed.
11	Lucia Francesca Menna, Antonio Santaniello, Margherita Todisco, Alessia Amato, Luca Borrelli, Cristiano Scandurra and Alessandro Fioretti, 2019	To contribute to the study of interspecific relationships in AAIs via theoretical considerations.	Animal assisted intervention; one health; interspecific relationship; interspecific attachment; zoonosis risks; safety of care administration	AAIs are increasingly attracting interest but still require further study to address the specific, standardized aspects that we consider essential.
12	Johanna Lass-Hennemann, Sarah K. Schäfer, M. Roxanne Sopp and Tanja Michael, 2020	To investigate pet ownership, attachment to pets, health-benefitting and psychopathological symptoms in medical staff, police officers, and firefighters	PTSD; posttraumatic stress; burnout; sense of coherence; resilience; locus of control; dog	The relationship between health-benefitting factors and attachment to pets could be explained by the association of health-benefitting factors and psychopathological symptoms.
13	Linda Jaasmaa, Isabelle Kamma, Annemie Ploegera, Mariska E. Kretb,c, 2020	To examine whether dogs show spontaneous helping behaviour towards a human experimenter that tries to obtain an object that is out of reach.	Canine Prosocial behaviour; Altruism; Social cognition	Majority of the dogs did not show spontaneous helping behavior towards humans
		that is out of reach.	Individual differences	

14	Lauren E. Thielke and Monique A.R. Udell, 2019	To characterize attachment relationships between humans and dogs living in animal shelters or foster homes, & to contextualize these relationships in the broader canine attachment literature.	Attachment behavior; shelter dog; foster dog; disinhibited attachment; attachment style	No differences were found between attachment proportions of shelter and foster dogs.
15	Elisabetta Palagi, and Giada Cordoni, 2020	To investigate if the ability to emotionally engage with conspecifics (wolf–wolf and dog–dog) is evolutionary rooted in canids and if provides the basis for the development of inter-specific emotional sharing (dog–human).	Motor resonance; facial displays; body signals; synchronization; yawn contagion; relationship quality; play fairness	Observational studies on groups of dogs belonging to the same breed and experimental studies including dogs of different breeds and their owners are necessary.
16	Hao-Yu Shih, Fillipe Georgiou, Robert A. Curtis, Mandy B. A. Paterson and Clive J. C. Phillips, 2020	To Introduce an innovative canine leash tension meter, for dogs walked on-leash, considering effects of dog age, size– weight, and dogs' behaviour during walks, to validate the meter.	Dog; leash; tension; human–dog interaction; shelter.	It measures the leash tension and, most importantly, detects the direction of pulling.
17	Emily E. Bray, Margaret E. Gruen, Gitanjali E. Gnanadesikan, Daniel J. Horschler Kerinne M. Levy, Brenda S. Kennedy, Brian A. Hare, Evan L. MacLean, 2020	To characterize the early ontogeny of dog cognition	Assistance dog behaviour canine cognition development temperament	This work has the potential to enhance the understanding of the processes through which adult cognitive and behavioural phenotypes arise & to inform the practices through which these traits are
				measured across dog development.



18	Lauren Powell , Kate M Edwards, Adrian Bauman, Paul McGreevy, Anthony Podberscek, Brendon Neilly, Catherine Sherrington, Emmanuel Stamatakis, 2020	To investigate changes in physical activity and other cardiometabolic risk factors following dog acquisition in a sample of 71 community-dwelling adults.	Self-reported And high-worn accelerometer-based physical activity patterns, systolic and diastolic blood pressures, resting heart rate and VO2max	Sample of community-dwelling dog owners, dog acquisition significantly increased objectively assessed human physical activity within 3 months.
19	László Zolt Garamszegi, Hans Temrin, Enikő Kubinyi, Ádám Miklósi, Niclas Kolm, 2019	To explore how these two Microevolutionary forces, common ancestry and gene flow, have played a role in mediating population divergence within a single species in a behavioral phenotype in a comparative study of dogs.	Admixture, domestication syndrome, haplotype sharing, hybridization, personality, population divergence, single value decomposition, statistical nonindependence	The evolutionary history of dog breeds has left remarkable signatures on the among-breed variation of a behavioural phenotype.
20	M. McBlain, K. A. Jones & G. Shannon, 2020	To investigate how social factors, anthropogenic disturbances and environmental conditions affected the sleep-vigilance trade-off in the Eurasian oystercatcher (Haematopus ostralegus).	Eurasian oystercatcher; Haematopus ostralegus; sleep; vigilance; anthropogenic disturbance; peeking; trade-off; energy budgets	Exposure to anthropogenic disturbance, particularly the presence of people exercising dogs, led to an increase in vigilance duration and reduced time sleeping, while increasing boat traffic resulted in elevated levels of peek frequency, but the overall duration of vigilance was in fact reduced.
21	Judith Benz-Schwarzburg, Susana Monsó and Ludwig Huber, 2020	To examine that how dogs perceive humans and how humans should treat their pet dogs.	Animal cognition, social cognition, animal ethics, human-animal interactions, positive duties, trust.	Dogs have special skills to grasp and interact with humans because of evolutionary history and domestication of species. Also affiliation plays a major role in shaping the dog's behavior towards humans specially.

22	Massimo Ari, Alessandra Alterisio, Anna Scandurra, Claudia Pinelli, Biagio D'Aniello, 2020	To verify whether the dog cognitive and behavioral studies were attracting the interest of scholars more than the studies on cognitive and behavioral sciences in general.	Bibliometrix, Behavioral science, Science mapping, Cognition, Behavior	In addition to Man's best friend is a Dog, now dog is becoming scholar's best friend also.
23	Sarah E. DeYoung, Ashley K. Farmer, Zoë Callaro and Shelby Naar, 2020	To understand disaster preparedness among service dog puppy raisers.	Disaster, preparedness, puppy raiser, service dogs, working dogs	The service puppy in training helps individuals to feel safe, learn how to keep their puppy in training safe during disasters.
24	PéterPongrácz and Sára S. Sztruhala, 2019	To highlight the possible importance of dog-dog interactions during the early life of puppies in forming stable and low-stressed interactions with other dogs later in life.	Behavior; dog, alloprenatal care, puppies, breeders.	The role of dog-dog interactions during the first two months of life might be important factor for proper socialization and later problem-free behavior with future canine partners.
25	Liam Clay, Mandy Paterson, Pauleen Bennett, Gaille Perry and Clive Phillips, 2019	To evaluate whether kennel monitoring of dogs could identify earlier signs of behavioral problems.	Behavior, problems, assessment, canines, shelters, prediction.	Behavioral assessment information can be related to behavior over the previous days since relinquishment to the novel surroundings.

I.

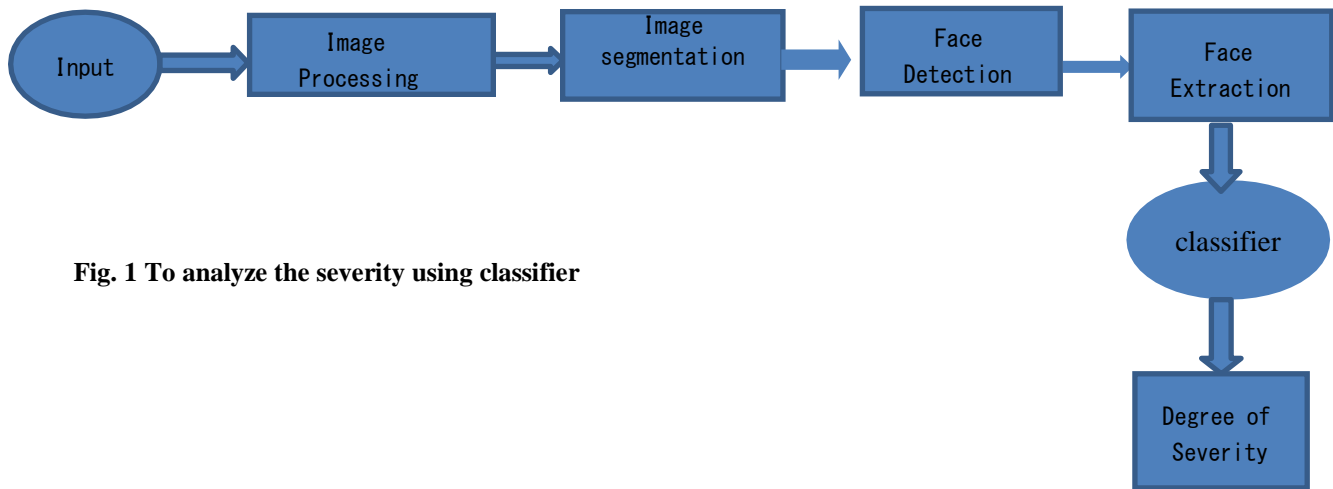
**General Method :** While dealing with puppies, it has been a great support that in USA a non-profit organization which

train the puppies or dogs for the people with disabilities. A procedure which USA organization has been developed is the “ Dog Cognition Test Battery” also known as DCTB. DCTB is used to analyze the testing age that may accommodate with healthy participation. For this Dogs under the age of 7 and 12 weeks is was considered. In total there were 4 tasks which were designed to access the social motivation, executive function as well as perception. As the analysis is time consuming of approximately 3 days hence the proposed work is not in continuation of the previous research.

III.

### PROPOSED WORK:

Human-dog analysis has been done in wide research but to detect the health issue in dogs or puppies is lagging in terms of research. For this an innovative approach has been introduced to analyze the health issues of dogs or puppies. The only category which will be considered in the proposed study is only for pets because it is easy to analyze the pets rather than the street dogs.



**Fig. 1 To analyze the severity using classifier**

To analyze the health issue in pets following steps will be considered:

Pets with in under age of 4 weeks

- Face image of the pet after concerning the owner
- Vaccination record of the pets
- Diet analysis of pet with the help of owner
- Daily activities of pets
- Support vector machine analysis using face model of pet
- 2-Dimensional analysis of image
- Variation greater than 50% may be considered on record
- MAMDANI Model to detect the accuracy

To analyze the health issue sample size will be at least 30 pets whether healthy or with some disabilities. The basic purpose of the proposed work is to take the preventive measures which will be helpful for pets to recover from their respective disabilities by regular analysis. For cross verification in the analysis questionnaire will be filled by the owner itself without the consent of owner no analysis will be done on their respective pets.

In case of severe disability in pets which is well known to the owner and requires any kind of surgery then that case will be analyzed with the help of innovative model using image processing in which face model will be considered.

#### IV. CONCLUSION:

The study has been concluded with the clear facts that whether surgery or operation is required to pets in case of disability with great recovery or not because in many cases pets undergo with the surgery and results in severe complications which are harmful for life of pets and are unknown to the experts as well.

Image processing technique along with MAMDANI Model results in great accuracy to analyze the features of pets/ dogs.



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